

DOCUMENT-IDENTIFIER: US 6262458 B1

TITLE: Low resistivity titanium silicide structures

BSPR:

Semiconductor memory devices are comprised of an array of memory cells.

Each

memory cell is comprised of a capacitor, on which the charge stored represents

the logical state of the memory cell. A charged capacitor corresponds to a logical state of "1" and an uncharged capacitor corresponds to a logical state

of "0." Word lines activate access transistors, so that the logical state of a memory cell can be read. Gates of multiple transistors are formed as one word line.

DEPR:

Certain Group VB nonmetal elements, such as: N, P, As, and Sb, can react with

titanium to form barrier materials (e.g., TiN, TiP, TiAs, and TiSb). While such elements increase the agglomeration temperature, too many Ti-VB ions at

C49-TiSi.sub.2 /Si (or polysilicon) interfaces hinders transformation of C49 to

C54. Group VB elements also have large mismatch covalent radii compared to

titanium, particularly As and Sb. This tends to drive the barrier material to the top surface of the TiSi.sub.2 film at high temperatures, resulting in agglomeration. High solubility of Group VB in TiSi.sub.2 may also affect Group

VB elements effectiveness as nucleation sites or boundary stabilizers.

However, tests for determining the best matrix implant element can be performed

to determine if combining elements of both Group VIA and Group VB is a good

choice for a matrix implant element.